

864 MOSHER: OPERATION ON ETHMOID CELLS.

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THE ANATOMY OF THE OPERATION OF REACHING THE ETHMOID CELLS THROUGH THE ANTRUM.

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IN working over some anatomical material I was struck with the ease with which the ethmoid cells—especially the middle and the posterior cells, which usually are so hard to get at—could be reached from the antrum through the upper part of its inner wall. Not only can these cells be opened up from here, but the sphenoidal sinus also. On the cadaver it is very satisfactory to see how directly and effectively this inaccessible region can be dealt with. It has been known for a considerable time that the antrum gives a good route to the sphenoid. In 1897, at the International Congress of Medicine at Moscow, Janzen reported a case of suppuration of the sphenoidal sinus which he had treated through the antrum. He found the ethmoid cells also diseased, and treated them likewise from the antrum. He was pleased with the method and advocated it. What I wish to do is to call attention to this route again, to consider briefly the applied anatomy of the operation, and to make it clear by means of diagrams.

If the antrum is opened from the canine fossa and the upper part of its inner wall along the line of the junction of the inner wall, and the roof of the antrum is examined, the following structures are found: The first quarter of an inch of the wall makes the outer boundary of

the lacrymal canal. The position of the canal is often indicated by a swelling. Just internal to this, or, if there is no swelling present, one-fourth to three-eighths of an inch from the surface, the ostium is placed. The ostium in some cases may be as much as one-half of an inch in; three-eighths of an inch, however, will usually clear the lacrymal canal. Beyond the ostium the upper part of the inner wall of the antrum is almost entirely membranous, except for the paper-like

FIG. 1.

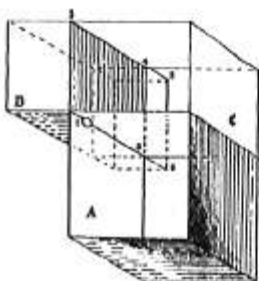


FIG. 2.



Fig. 1 shows in a diagrammatic way the relations of the orbit (C), the antrum (A), and the ethmoid cells (B). For the sake of clearness the sphenoidal sinus is represented as continuous with the ethmoid parallelagram. The figure shows particularly well the position of the ostium of the antrum (1) and the line of the incision for approaching the ethmoid region. The incision should start in the ostium and run directly backward about one-half of an inch, guided by the lower inner angle of the orbit. It would be represented by the line 1-2. In front of the ostium is the lacrymal duct. If the curette, therefore, is entered at the ostium, and not farther forward, the lacrymal duct is not in danger.

Fig. 2, a horizontal section through the orbit and the nose at the level of the cribriform plate—that is, the section is passed about one-eighth of an inch above the inner canthus of the eye. It shows the ethmoid parallelagram. The anterior boundary of this is the frontal bone, the posterior boundary the sphenoid; the outer boundary is the inner wall of the orbit, and the inner boundary the inner surface of the middle turbinal bone for the greater part, with just a little of the frontal. In a section made through the inner canthus of the eye (one-eighth of an inch below the section which is figured here) this sphenoid ceases to be a boundary.

process of the ethmoid (the uncinata), which projects downward and strengthens it. In 10 per cent. of the cases the antrum has a second ostium. This has no definite position. A knife, therefore, entered at the ostium, inclined toward the horizontal as much as the opening in the canine fossa permits, and carried directly backward, would cut only the membranous part of the wall, except, of course, this unimpor-

tant process of the ethmoid, and would bring up against the maxillary process of the palato bone. In many cases this is extremely thin, so that the knife would penetrate this and be stopped by the ascending process of the palate where it lies against the posterior inner angle of the superior maxilla, like one finger against another, and strengthens it. The lacrymal canal is entirely out of relation to the incision. The incision so made is about one-half of an inch long. No vessels of any size are cut. The inner wall of the antrum hangs like a curtain from the lower part of the inner angle of the orbit. The knife shaves it off

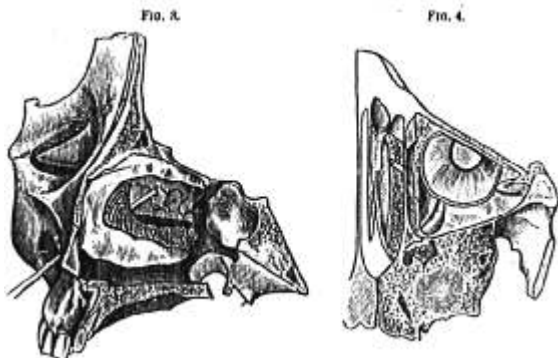


Fig. 3 shows the method of reaching the ethmoid cells from the antrum and the incision in the upper part of its inner wall through which this is accomplished. The anterior end of the incision is at the point where the probe is entered. (This corresponds to the ostium.) The crescentic line in front of this is the anterior border of the hiatus semilunaris. From the probe horizontally backward the heavy black line is the incision through which the cells have been reached. Above this the drawing shows how the middle and posterior ethmoid cells have been cleared away, and farther back shows how the front wall of the sphenoidal sinus has been broken down.

Fig. 4 is the same region shown in Fig. 3, but from above. The ethmoid cells have been cleared away from below, as just described. The probe is pushed up into the empty ethmoid region through the ostium of the antrum. The inner wall of the middle turbinate hangs like a curtain on the inner side of the empty ethmoid space.

much as the mesentery is cut from the small bowel. For practical purposes the inner wall of the antrum can be regarded as made up much the same as it is in the disarticulated bone—that is, the first quarter of an inch is the outer boundary of the lacrymal canal; then comes the ostium, next one-half inch of membrane, and finally, for three-eighths of an inch, bone again.

A curette entered through the ostium, inclined toward the septum, and carried back in this incision would strike, first, the ethmoid bulla with the rest of the middle ethmoid cells, then the posterior cells, and,

finally, the anterior wall of the sphenoid. The ethmoid parallelogram is opened from its lower outer angle, and the cells can be removed by working upward and inward, toward the septum and away from the orbit. The height of the working space is the height of the os planum of the ethmoid minus the notch made in the upper wall of the ethmoid parallelogram by the dipping downward of the olfactory groove. This leaves the working space about one-half inch.

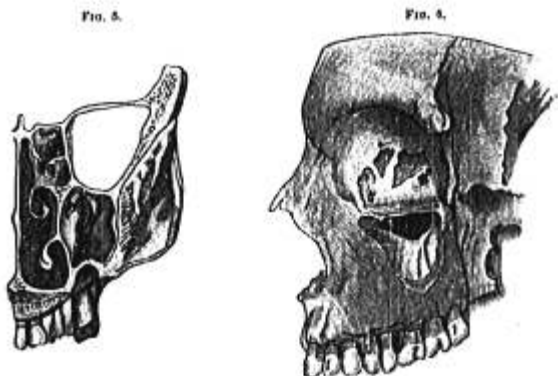


Fig. 5 is a horizontal section through the antrum, about one quarter of an inch behind the ostium. It shows the ethmoid parallelogram nicely, especially the lower outer angle, where it meets the orbit and the antrum. The anterior part of the inner wall of the antrum is also shown. The dark spot in the upper part of this is the ostium. In front of the ostium is the swelling made by the lacrymal duct. From this figure it is plain how an instrument entered at the ostium and pushed diagonally upward at once enters the ethmoid parallelogram.

Fig. 6 is copied from Watson Williams. It shows the inner wall of the antrum on the dried and cleaned skull. The dark area represents the membranous part of the inner wall. It is a little large in this specimen, because some of the paper-like uncinuate process of the ethmoid has been broken off, as well as the maxillary process of the palate bone. It represents fairly, however, the area of the membranous wall from the operating standpoint.

In combined empyemata of the antrum and the middle and posterior ethmoid cells it would seem that this route should give good results. Where the frontal sinus is the sinus particularly affected I should doubt whether this method of dealing with the ethmoid region would be sufficient; but in those cases where the frontal suppuration is secondary to suppuration in the ethmoid region it might be of value.